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THE NATH LAW GROUP				
112 South West Street				
Alexandria, VA 22314				
EXAMINER				
EOM, ROBERT J				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/551,784

Applicant(s)

BAEK ET AL.

Examiner

ROBERT EOM

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 February 2009.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-16 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 24 February 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date 12/17/2008
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Regarding claims 1, 6, and 11 the structural relationship between the waveguide and the reaction tube plate is unclear. The limitation "the optical waveguide which has a facet shape to be fitted with that of a reaction tube plate" seems to imply the optical waveguide is physically connected to the reaction tube plate, however in the applicant's disclosure, Figures 1 and 6 the waveguide (8) has no physical structural relationship with the reaction tube plate (34). Therefore, for purposes of examining, this limitation will be interpreted to simply mean the waveguide projects light to the reaction tube plate.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA, see: Fig. 2 and Fig. 5), in view of Mawatari (US 2003/0002038 A1) and Olshansky (USP 4,689,797).

Regarding claim 1, AAPA discloses A real-time monitoring apparatus for biochemical reaction (Fig. 2), which comprises: a temperature control block comprising a thermoelectric element (see: 2) capable of supplying heat into reaction tubes (see: 4) and a heat transmission block (see: 3) which transmit the

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heat to the reaction tubes (see: 4); a light irradiation source comprising a lamp (see: 5) which irradiates light with uniform intensity to sample contained in the reaction tube; and an optical system comprising receiving part (see: 12) for receiving fluorescence irradiated from the sample by the light emitted from the light irradiation source (Fig. 2).

While AAPA does not explicitly disclose the light irradiation source comprising an optical waveguide. Mawatari teaches a photothermal spectroscopic analyzer (Abstract) which performs thermal lens spectrometry ([0014-0015]) with a light source comprising an index guided type semiconductor laser with a waveguide ([0100]). It would have been obvious to one having ordinary skill in the art at the time of the invention to use an optical waveguide in the system of AAPA, as taught by Mawatari since it is most desirable that the excitation light source has a wavelength nearer to an infrared region ([0100]).

While modified AAPA does not explicitly disclose the optical waveguide being faceted, Olshansky teaches an index guided semiconductor laser (Fig. 1) with a faceted waveguide (Fig. 3A and 3B). It would have been obvious to substitute one known index guided semiconductor laser for another index guided semiconductor laser in the monitoring apparatus of modified AAPA, as taught by Olshansky, since doing so provides for low series resistance, low thermal impedance, and reduced operating current and photon densities (Olshansky: C4/L10-12).

Regarding claim 2, modified AAPA discloses all of the claim limitations as set forth above. AAPA further discloses wherein the lamp (Fig 2, see: 5) includes a first ellipsoidal reflecting mirror (Fig. 2, see: ellipsoidal reflector on lamp 5).

Regarding claim 3, modified AAPA discloses all of the claim limitations as set forth above, but the reference does not explicitly disclose the refractive index of medium of the optical waveguide is $1.35 \sim 2.0$. As the phase velocity is a variable that can be modified by adjusting the said refractive index, with said phase velocity decreasing as the refractive index is increased, the precise refractive index would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed refractive index cannot be considered critical. Accordingly one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the refractive index of modified AAPA to obtain the desired phase velocity (In re Boesch, 617 F2D. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

Regarding claims 4 and 5, modified AAPA discloses all of the claim limitations as set forth above. While, modified AAPA does not explicitly disclose the optical waveguide having a rectangular or round shape, it would have been obvious to try, choosing from a finite number of identified, predictable types of waveguides.

Regarding claim 6, AAPA discloses a real-time monitoring apparatus for biochemical reaction (Fig. 2), which comprises: a temperature control block comprising a thermoelectric element (see: 2) capable of supplying heat into reaction tubes (see: 4) and a heat transmission block (see: 3) which transmit the heat to the reaction tubes containing sample (see: 4); a light irradiation source comprising a lamp (see: 5) which irradiates light with uniform intensity to sample contained in the reaction tube, a condensing lens 3 (see: 17); and an optical system comprising receiving part (see: 12) for receiving fluorescence irradiated from the sample by the light emitted from the light irradiation source (Fig. 2).

While AAPA does not explicitly disclose the light irradiation source comprising an optical waveguide. Mawatari teaches a photothermal spectroscopic analyzer (Abstract) which performs thermal lens spectrometry ([0014-0015]) with a light source comprising an index guided type semiconductor laser with a waveguide ([0100]). It would have been obvious to one having ordinary skill in the art at the time of the invention to use an optical waveguide in the system of AAPA, as taught by Mawatari since it is most desirable that the excitation light source has a wavelength nearer to an infrared region ([0100]).

While modified AAPA does not explicitly disclose the optical waveguide being faceted, Olshansky teaches an index guided semiconductor laser (Fig. 1) with a faceted waveguide (Fig. 3A and 3B). It would have been obvious to substitute one known index guided semiconductor laser for another index guided semiconductor laser in the monitoring apparatus of modified AAPA, as taught by Olshansky, since doing so provides for low series resistance, low thermal

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impedance, and reduced operating current and photon densities (Olshansky: C4/L10-12).

Regarding claim 7, modified AAPA discloses all of the claim limitations as set forth above. AAPA further discloses wherein the lamp (Fig 2, see: 5) includes a parabolic mirror (Fig. 2, see: reflector on lamp 5).

Regarding claim 8, modified AAPA discloses all of the claim limitations as set forth above, but the reference does not explicitly disclose the refractive index of medium of the optical waveguide is 1.35 ~ 2.0. As the phase velocity is a variable that can be modified by adjusting the said refractive index, with said phase velocity decreasing as the refractive index is increased, the precise refractive index would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed refractive index cannot be considered critical. Accordingly one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the refractive index of modified AAPA to obtain the desired phase velocity (In re Boesch, 617 F2D. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

Regarding claims 9 and 10, modified AAPA discloses all of the claim limitations as set forth above. While, modified AAPA does not explicitly disclose the optical waveguide having a rectangular or round shape, it would have been

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obvious to try, choosing from a finite number of identified, predictable types of waveguides.

Regarding claim 11, AAPA discloses A real-time monitoring apparatus for biochemical reaction (Fig. 2), which comprises: a temperature control block comprising a thermoelectric element (see: 2) capable of supplying heat into reaction tubes (see: 4) and a heat transmission block (see: 3) which transmit the heat to the reaction tubes containing sample (see: 4); a light irradiation source comprising a lamp (see: 5) which irradiates light with uniform intensity to sample contained in the reaction tube; and an optical system comprising a light receiving part (see: 12) for receiving fluorescence generated by the light irradiated from the light source (Fig. 2).

While AAPA does not explicitly disclose the light irradiation source comprising an optical waveguide and a second reflecting mirror which alters the light path. Mawatari teaches a photothermal spectroscopic analyzer (Abstract) which performs thermal lens spectrometry ([0014-0015]) with a light source comprising an index guided type semiconductor laser with a waveguide ([0100]). Mawatari further discloses a beam splitter (Fig. 2, see: 14) which alters the path of the laser. It would have been obvious to one having ordinary skill in the art at the time of the invention to use an optical waveguide in the system of AAPA, as taught by Mawatari since it is most desirable that the excitation light source has a wavelength nearer to an infrared region ([0100]).

While modified AAPA does not explicitly disclose the optical waveguide being faceted, Olshansky teaches an index guided semiconductor laser (Fig. 1)

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with a faceted waveguide (Fig. 3A and 3B). It would have been obvious to substitute one known index guided semiconductor laser for another index guided semiconductor laser in the monitoring apparatus of modified AAPA, as taught by Olshansky, since doing so provides for low series resistance, low thermal impedance, and reduced operating current and photon densities (Olshansky: C4/L10-12).

Regarding claim 12, modified AAPA discloses all of the claim limitations as set forth above. Modified AAPA further discloses two or more the second reflecting in mirror which alters light path (Fig. 2, see: beam splitter 14 and half mirror 31).

Regarding claim 13, modified AAPA discloses all of the claim limitations as set forth above. Modified AAPA further discloses the lamp (Fig 2, see: 5) comprises an ellipsoidal mirror (Fig. 2, see: ellipsoidal reflector on lamp 5).

Regarding claim 14, modified AAPA discloses all of the claim limitations as set forth above, but the reference does not explicitly disclose the refractive index of medium of the optical waveguide is $1.35 \sim 2.0$. As the phase velocity is a variable that can be modified by adjusting the said refractive index, with said phase velocity decreasing as the refractive index is increased, the precise refractive index would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed refractive index cannot be considered critical. Accordingly one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the

refractive index of modified AAPA to obtain the desired phase velocity (In re Boesch, 617 F2D. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

Regarding claims 15 and 16, modified AAPA discloses all of the claim limitations as set forth above. While, modified AAPA does not explicitly disclose the optical waveguide having a rectangular or round shape, it would have been obvious to try, choosing from a finite number of identified, predictable types of waveguides.

Response to Arguments

8. Applicant's arguments with respect to claims 1-13 have been considered but are moot in view of the new ground(s) of rejection.

The applicant has amended language to the structural shape of the optical waveguide and its structural relationship to a reaction tube plate (added within the independent claims 1, 6, and 11).

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT EOM whose telephone number is (571)270-7075. The examiner can normally be reached on Mon.-Thur., 9:00am-5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tony G Soohoo/
Primary Examiner, Art Unit 1797

/R. E./
Examiner, Art Unit 1797